Putron Electronics

VGA Matrix Switchers System

User Manual

Putron

MVG Series ---Computer Graphics (VGA)/Stereo Audio Matrix

Please read this manual carefully before using this product.

Notice：

This **MVG Matrix Switchers User Manual** takes example of the Matrix model MVG88A. It can be used as user's manual of other MVG matrix switcher models.

This manual is only an instruction for operators, not for any maintenance usage. Any changes of functions and parameters since then will be informed separately. Please refer to the dealers for the latest details.

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All product function is valid till 2008-1-1

⚠ Safety Operation Guide

In order to ensure the credibility use of the product and the user's safety, please comply with the following items during installation and maintenance:

①

The system must be earthed properly. Please do not use two blades plugs and ensure the alternating power supply ranged from 100v to 240v and from 50Hz to 60Hz.

②

Do not put the switcher in a place of too hot or too cold.

③

To avoid any damage by over heat, please keep the working environment good in ventilation to radiate the heat when running the switcher.

④

The switchers should be turned off when in rainy and humid days or nonuse for a long time,

⑤

The alternating power supply line should be disconnected with the power socket during the following operation.

A. Take out or reinstall any component of the switcher
B. Disconnect or re-connect any connector of the switcher

⑥

Please do not attempt to maintain and uncover the switcher for there is a high-voltage component inside and the risk of the electric shock.

⑦

Do not splash any chemical product or liquid on or near the equipment.

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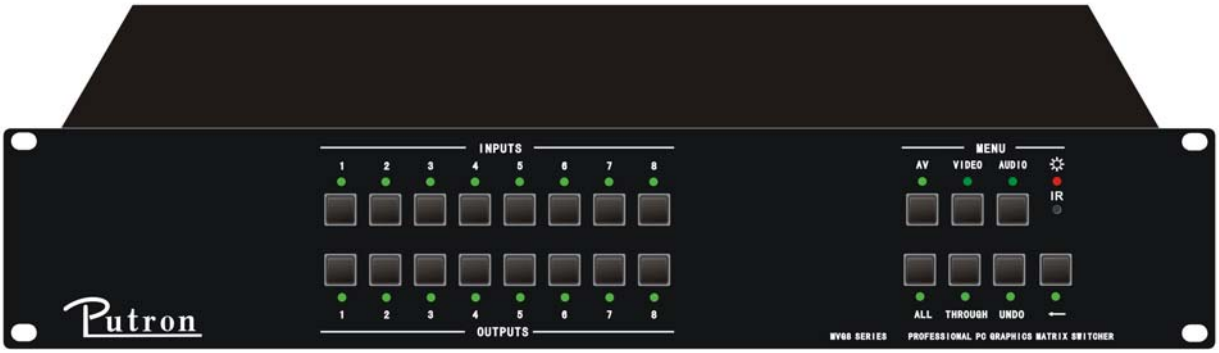
1. Introduction

1.1 About MVG Matrix Switcher System

MVG series Matrix switcher is a high-performance professional computer and audio signal switcher that can be used for cross switching of multi computer and audio signal.

MVG series switcher mostly apply in broadcasting TV engineering, multi-media meeting room, big screen display engineering, television education, command control center or other fields. It provides power-fail locale protection function, LED indicating, shortcut selecting function. With RS232 interface, it can be worked with PC, remote control system and any other far-end control system devices . The user manual takes MVG88 as the example; other models can take reference from it too.



F 1-1 MVG 88A

1.2 MVG Matrix Switcher Models

According to different situation and users, the MVG series can be classified into the following models:

Specifications / Models	Video Inputs	Video Outputs	RS232 Interface	Audio I/O
MATRIX WVG8A	8	1	√	×
MATRIX WVG16A	16	1	√	×
MATRIX WVG32A	32	1	√	×
MATRIX MVG44A	4	4	√	√
MATRIX MVG82	8	2	√	×
MATRIX MVG82A	8	2	√	√
MATRIX MVG84	8	4	√	×
MATRIX MVG84A	8	4	√	√
MATRIX MVG88	8	8	√	×
MATRIX MVG88A	8	8	√	√
MATRIX MVG164	16	4	√	×
MATRIX MVG164A	16	4	√	√

Specifications / Models	Video Inputs	Video Outputs	RS232 Interface	Audio I/O
MATRIX MVG168	16	8	√	×
MATRIX MVG168A	16	8	√	√

2. Packing of the Product

MVG Matrix Host

RS-232 Communication Cord

Power Supply Cord

CD with Application

3. Installation

MVG matrix switchers adopt metal shell and can be stacked with other device. Moreover, they are rack-mountable enclosure and can be installed in the standard 19” rack.

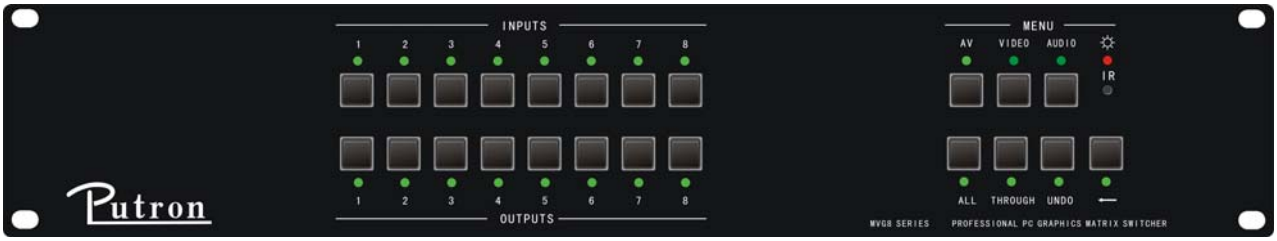
F 3-1 Installing the MVG matrix switcher in the standard 19” rack

4. Front View of the Product

4.1 Front View of the MVG44A

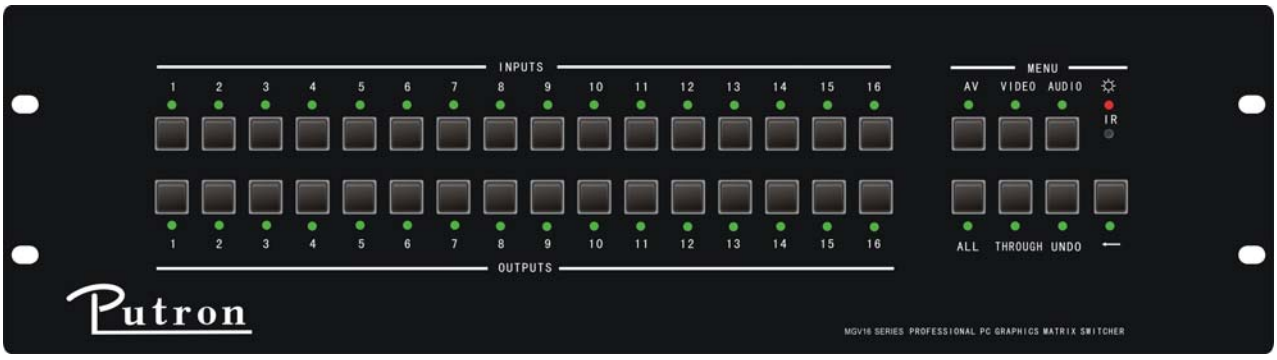
F 4-1 Front view of the MVG44A

4.2 Front View of the MVG82A、MVG84A、MVG88A



F 4-4 Front view of the MVG82A、MVG84A、MVG88A

4.3 Front View of the MVG164A、MVG168A、MVG1616A


INPUTS
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
MENU
AV VIDEO AUDIO
IR
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
OUTPUTS
ALL THROUGH UNDO
Putron
MGV16 SERIES PROFESSIONAL PC GRAPHICS MATRIX SWITCHER

F 4-5 Front view of the MVG164A、MVG168A、MVG1616A

5. Rear View of the Product

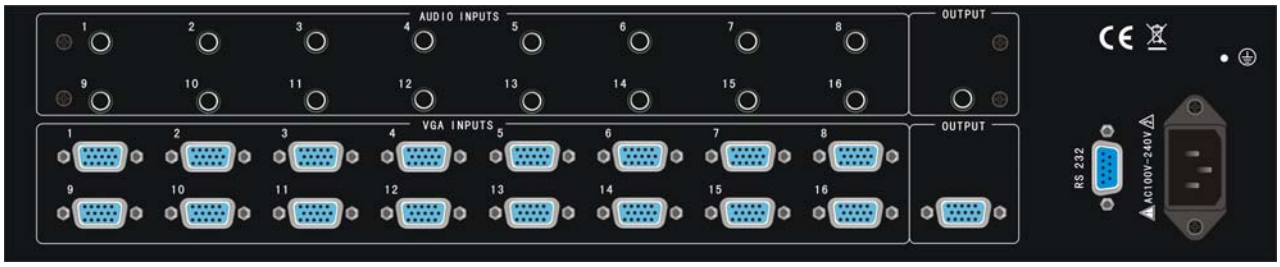
5.1 Rear View of the VGA44A

F 5-1 Rear view of the VGA44A

5.2 Rear View of the WVG8

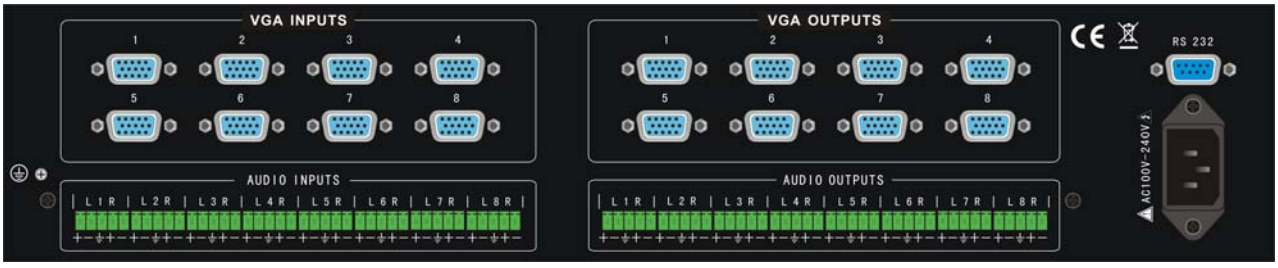
F 5-2 Rear view of the WVG8

5.3 Rear View of the WVG16、WVG32



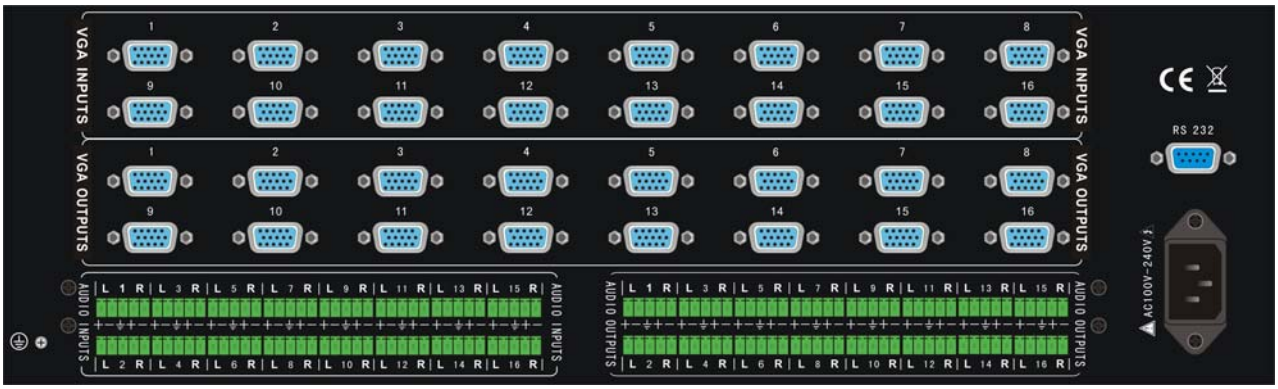
F 5-3 Rear view of the WVG16,WVG32

5.4 Rear View of the MVG82A、MVG84A、MVG88A



F 5-4 Rear view of the MVG82A、MVG84A、MVG88A

5.5 Rear View of the MVG164A、MVG168A、MVG1616A



F 5-5 Rear view of the MVG164A、MVG168A 、MVG1616A

6. External Connection

6.1 Introduction of the Input and Output Connectors

The MVG matrix switchers adopt female 15-pin HD connectors as the video signal I/O interface, and captive screw connectors as the audio signal I/O interface. Please refer to the rear view figure of the model concerned for details.

6.2 Connection of RS-232 Communication Port

Except the front control panel, infrared remote controller (Optional) and the Ethernet control (Optional), the MVG matrix switcher can be controlled from far-end control systems via the RS-232 communication port.

This RS-232 communication port is a female 9-pin D connector. The definition of its pins is as the table below.

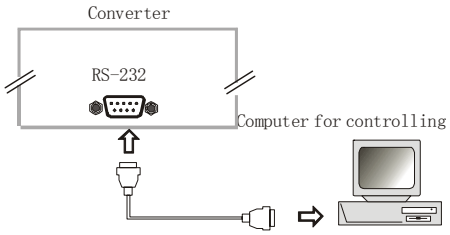
Pin	RS-232	Description
1	N/u	Not used
2	Tx	Transmit data
3	Rx	Receive data
4	N/u	Not used
5	Gnd	Signal ground
6	N/u	Not used
7	N/u	Not used
8	N/u	Not used
9	N/u	Not used

6.2.1 Connection with Control Systems

With the RS-232 port, can control and communicate with the switcher remotely.

6.2.2 Connection with Computer

When the switcher connects to the COM1 or COM2 of the computer with control software, users can control it by that computer.
To control the switcher, users may use the RS232 software.



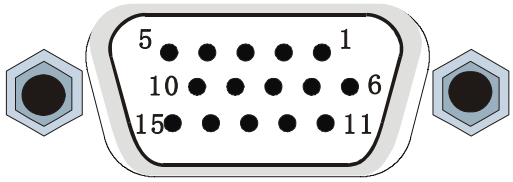
F 6-1 Connection between MVG matrix switcher and the computer

6.3 How to Connect with the Input and Output Terminals

The MVG matrix switchers may take laptops, desktop computers, graphic workstations and document cameras as their input signal source, and projectors, RP TVs, displayers and amplifiers as their output signal destinations.

VGA Connection:

The MVG matrix switchers support all kinds of the RGB and VGA signal sources with 15-PIN HD VGA connectors.
The 15-PIN HD VGA connector is shown as the figure below.



Pin	RGB	YcbCr
1	R	Cr
2	G	Y
3	B	Cb
4	Not used	
5	Ground	
6	R ground	Cr ground
7	G ground	Y ground
8	B ground	Cb ground
9	Not used	
10	Sync signal ground	
11	Not used	
12	Not used	
13	H or H/V	
14	V	
15	Not used	

F 6-2 15-PIN HD VGA connector

If the RGB device doesn't with VGA output terminals, please convert the signals with an RGB to VGA switcher for getting high quality VGA output effects.

Please use the special VGA signal cord to connect the input and output devices and connect the 15-Pin HD connectors carefully.

Audio Signal Connection:

Audio connection is little complicated than video. It has two kinds of connection: balanced and unbalanced.

The balanced connection transmits a pair of balanced signals with two signal cords. Because interferences will have the same intensity and the opposite phases on the two signal cords, it will be counteracted in the end. For the low frequency extent of the audio signal, it would be easily interfered under long distance transmission. Therefore，as an anti-interference connection , it is mostly used in audio connection of special device.

The unbalanced connection transmits signals only with a signal cord. Without counteraction, it can be interfered more easily. Accordingly, it is adopted for household appliance or some cases with low technical demand.

The two kinds of connection are shown below.

Unbalanced Input　Unbalanced Output　Balanced Input　Balanced Output

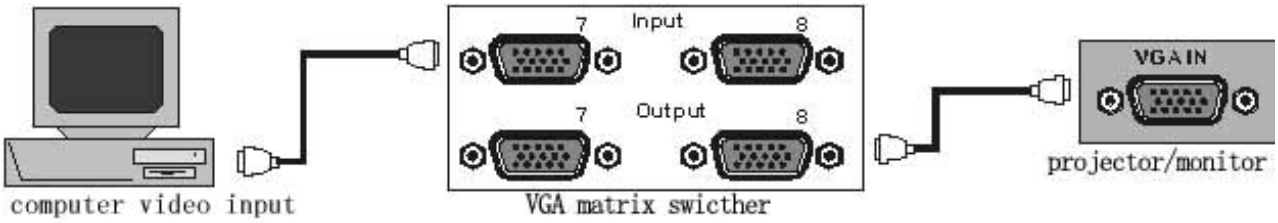
F 6-3　Balanced/unbalanced connection on captive screw connector

The connection should be selected is up to the interface of the device. When available, the balanced connection is the first choice. Before connection, please read the command or relevant demand in the user manual carefully. In some cases, maybe there is balanced in source signal end but unbalanced in the destination end. If in a nonstandard case, it is done to connect balanced for the balanced end and unbalanced for unbalanced end. But if in a standard one, the converter must be used to switch the signals as the same, balanced or unbalanced.

F 6-4 Connection of MVG matrix switcher system

6.4 How to Connect with the MVG I/O Devices

VGA/VGA signal converter is for the VGA signal source without VGA output ports, such as: desktop computers and notebooks. It can convert the VGA signals to VGA signals.



F 6-5 Connection of VGA I/O devices

7. Operation of the Control Panel

7.1 Front Panel Description

"AV" AV synchronal button: To transfer video and audio signal synchronously by the switcher
Example: To transfer both the video and the audio signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order "AV","3",, "4"".

"VIDEO" Video button: To transfer only video signals from input channel to output channel
Example: To transfer video signals from input channel No.3 to output channel No.4.
Operation: Press buttons in this order "VIDEO", "3", "4".

"AUDIO" Audio button: To transfer only audio signals from input channel to output channel
Example: To transfer audio signals from input channel No.2 to output channel No.3.
Operation: Press buttons in this order ""AUDIO", "2", "3"".

"1,2,3,4" I/O Keypads: Keys to select I/O channels.
Example: To transfer input channel No.3 to output channel No.1
Operation: Press buttons in this order : "3" in INPUT area, "1" in OUTPUT area.

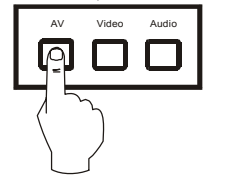
7.2 Command Format of the Switching Operation

With the front control panel, the switcher could be control directly and rapidly by pressing the buttons under below format.
"Menu" +"Input Channel" +"Output Channel 1"

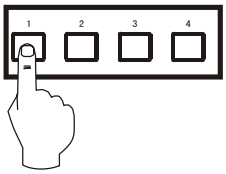
"Menu": "AV", "Audio", "Video"
"Input Channel": Fill with the number of input channel to be controlled
"Output Channel": Fill with the number of output channels to be controlled

7.3 Examples of Operation

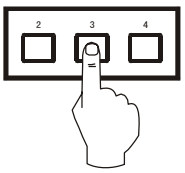
Example 1：To transfer video and audio signals from input channel No.1 to output channel No.3,4



1, Press the button for switching mode “AV” for the switching mode of video and audio (“Audio” for the switching mode of audio only; “Video” for the switching mode of video only)

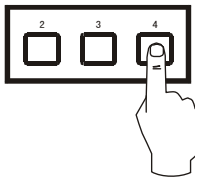


2, Press the button for input channel number“1”



3,Press the button for the first output channel number “3”

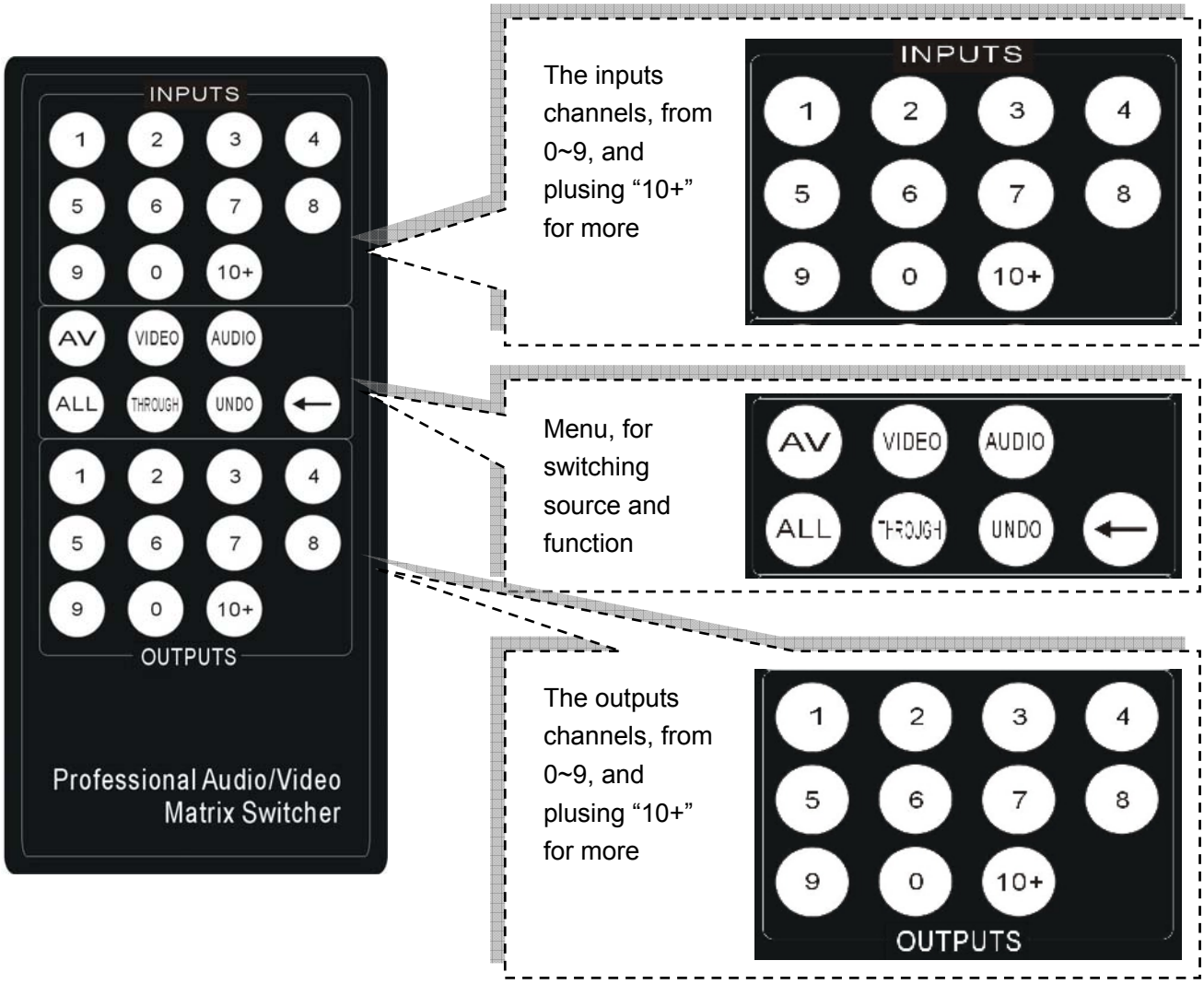
4, Press the button for the second output channel number “4”



Then, switching OK ! audio/video switching from “1” to “3” and “4”

8. Usage of the Remote Controller

With the infrared remote controller, the matrix switcher could be control remotely. Because the function buttons on the remote controller are the same with the ones on the front control panel, the remote controller shares the same control operation and command format with the control panel. P



9. Communication Protocol and Command Codes

With this command system, the RS232 software is able to control and operate the MCV Matrix remotely.

Communication protocol:

Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none

Command Types	Command Codes	Functions
System Command	/*Type;	Inquire the models information.
	/%Lock;	Lock the keyboard of the control panel on the Matrix.
	/%Unlock;	Unlock the keyboard of the control panel on the Matrix.
	/^Version;	Inquire the version of firmware
	/:MessageOff;	Turn off the feedback command from the com port. It will only show the “switcher OK”.
	/:MessageOn;	Turn on the feedback command from the com port.
	Undo.	To cancel the previous operation.
	Demo.	Switch to the “demo” mode, 1->1, 2->2, 3->3 … and so on.
	[x1]All.	Transfer signals from the input channel [x1] to all output channels
	All#.	Transfer all input signals to the corresponding output channels respectively.
	All$.	Switch off all the output channels.
	[x1]#.	Transfer signals from the input channel [x1] to the output channel [x1].
	[x1]$.	Switch off the output channel [x1].
Operation Command (PUTRON2.0 Command System)	[x1] V[x2].	Transfer the video signals from the input channel [x1] to the output channel [x2].
	[x1] V[x2],[x3],[x4].	Transfer the video signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] A[x2].	Transfer the audio signals from the input channel [x1] to the output channel [x2].
	[x1] A[x2],[x3],[x4].	Transfer the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	[x1] B[x2].	Transfer both the video and the audio signals from the input channel [x1] to the output channel [x2].
	[x1] B[x2],[x3],[x4].	Transfer both the video and the audio signals from the input channel [x1] to the output channels [x2], [x3] and [x4].
	Status[x1].	Inquire the input channel to the output channel [x1].
	Status.	Inquire the input channel to the output channels one by one.

	Save[Y].	Save the present operation to the preset command [Y]. [Y] ranges from 0 to 9.
	Recall[Y].	Recall the preset command [Y].
	Clear[Y].	Clear the preset command [Y].

Note:

1. [x1], [x2], [x3] and [x4] are the symbols of input or output channels ranged according to the model of the matrix switcher. If the symbols exceed the effective range, it would be taken as a wrong command.
2. In above commands, "["and "]" are symbols for easy reading and do not need to be typed in actual operation.
3. Please remember to end the commands with the ending symbols "." and ";".

Detail Examples:

1、 Transfer signals from an input channel to all output channels: [x1]All.
Example: To transfer signals from the input channel No.3 to all output channels. Run Command: "3All."

2、 Transfer all input signals to the corresponding output channels respectively: All#.
Example: If this command is carried out on an MVG1616-A matrix switcher, the status of it will be: 1->1, 2->2, 3->3, 4->4……16->16.

3、 Switch off all the output channels: All$.
Example: After running this command, there will be no signals on all the output channels.

4、 Check the version of the firmware: /^Version;
To check the version of the firmware.

5、 Switch off the detail feedback command from the COM port: /:MessageOff;
Switch off the detail feedback information from the COM port. But, it will leave the "switch OK" as the feedback, when you switch the matrix.

6、 Switch on the detail feedback command from the COM port: /:MessageOn;
Switch on the detail feedback information from the COM port. it will show the detail switch information when it switch. Example: when switch 1->2 for Audio, it will feedback "A0102".

7、 Transfer signals from an input channel to the corresponding output channel: [x]#.
Example: To transfer signals from the input channel No.5 to the output channel No.5. Run Command: "5#."

8、Switch off an output channel: [x]$.
Example: To switch off the output channel No.5. Run Command: "5$."

9、Switch video signals command: [x1] V[x2].
Example: To transfer the video signals from the input channel No.3 to the output channel No.5.
Run Command: "3V5."

10、Switch audio signals command: [x1] A[x2].
Example: To Transfer the audio signals from the input channel No.10 to the output channel
Run Command: "10A2."

11、Switch both video and audio signals synchronously: [x1] B[x2].
Example: To transfer both the video and the audio signals from the input channel No.120 to the output channel No.12,13,15. Run Command: "120B12,13,15."

12、Inquire the input channel to the output channel [x]: Status[x].

Example: To inquire the input channel to the output channel No.23. Run Command: “Status23.”

13、Inquire the input channel to the output channels one by one: Status.

Example: To inquire the input channel to the output channels one by one. Run Command: “Status.”

14、Save the present operation to the preset command [Y]: Save[Y].

Example: To save the present operation to the preset command No.7. Run Command: “Save7.”

15、Recall the preset command [Y]: Recall[Y].

Example: To recall the preset command No.5. Run Command: “Recall5.”

16、Clear the preset command [Y]: Clear[Y].

Example: To clear the preset command No.5. Run Command: “Clear5.”

10. Technical Specifications

Series / Specifications	MVG44A	MVG8 series	MVG16 series	WVG8	WVG32 series
Video					
Models included	MVG44A	MVG82A MVG84A MVG88A	MVG164A MVG168A	WVG8	WVG32 WVG 64 WVG 96
Gain	0 dB				
Bandwidth	250MHz (-3dB), fully loaded				
Cross talk sum	-60dB @10 MHz， -39dB @100 MHz				
Switching speed	200 ns (Max)				
Signal type	VGA，VGAS，RGsB，RsGsBs，HDTV，Component video，S-video，Composite video				
Input video					
Connector	Female 15-pin HD				
Signal strength	1V p-p Y component video、S-video，composite video； 0.7V p-p VGA；0.3V p-p R-Y & B-Y component video、 S-video				
Maximum/Minimum level	Analog signals: 0.5V ~ 2.0V p-p				
Impedance	75 Ω				
Echo loss	<-40dB@5MHz				
Horizontal frequency response	15 kHz ~ 145 kHz				
Vertical frequency response	30 Hz ~ 170 Hz				
Max error in DC offset	15mV				
Output video					

Series / Specifications	MVG44A	MVG8 series	MVG16 series	WVG8	WVG32 series
Connector	Female 15-pin HD				
Maximum/Minimum level	2.0V p-p				
Impedance	75 Ω				
Echo loss	<-40dB@5MHz				
Max compensation in Dc offset	±5mV				
Sync signal					
Input/output signals	RGBHV, RGBS, RGsB, RsGsBs, Component video， Composite video				
Video system	NTSC 3.58，NTSC 4.43，PAL，SECAM				
Input level	0.5V- 5.0V p-p,: 4.0V p-p normal				
Output level	AGC-TTL: 5Vp-p, unterminated				
Input impedance	510 Ω				
Output impedance	75 Ω				
Maximum transmission delay	Horizontal:90ns Vertical:160ns				
Maximum ascending/descending time	4ns				
Polarity	Straight or subtractive according to input				
Audio signal					
I/O connector	3.8mm with screw , 5 pole				
Gain	0dB				
Frequency respond	20 Hz ~ 20 kHz,				
General harmonic distortion + noise	0.05% @ 1 kHz （under rating voltage）				
S/N	>90dB				
Segregation rate	>80dB @ 1 kHz				
CMRR	>75dB @: 20 Hz ~ 20 kHz				
Signal	Stereo ，balanced /unbalanced				
Impedance	Input：>10 kΩ（balanced /unbalanced） Output：50 Ω （unbalanced），100 Ω（balanced）				
Maximum input level	+19.5dBu, （balanced /unbalanced）				
Gain error	±0.1dB @20 Hz ~ 20 kHz				
Max output level	+19.5dBu, （balanced /unbalanced）				
Control type					

Series / Specifications	MVG44A	MVG8 series	MVG16 series	WVG8	WVG32 series
Serial control port	RS-232, 9-pin FD connector				
Baud rate and protocol	Baud rate: 9600 Data bit: 8 Stop bit: 1 Parity bit: none				
Serial control poling protocol	2 = TX, 3 = RX, 5 = GND				
Control application	Switch 2.0				
Features					
Power supply	100VAC ~ 240VAC, 50/60 Hz, universal international power supply				
Temperature	Storing and operating temperature: -20° ~ +70°C				
Humidity	Storing and operating humidity: 10% ~ 90%				
Size	485(L)X245(W)X445mm(H)	485(L)X260(W)X90mm(H)	485(L)X260(W)X140mm(H)	485(L)X245(W)X445mm(H)	485(L)X260(W)X90mm(H)
weight	1.8kg	3.5kg	4.3kg	1.8kg	3.5kg
MTBF	30,000 hours				
Quality guarantee	1 year free guarantee				

11. Troubleshooting & Maintenance

1) When the output image in the destination device connected to the MVG Matrix has ghost, such as the projector output with ghost, please check the projector's setting or try another high quality connection cord.

2) When there is a color losing or no video signal output, it may be the unmatched VGA connector order between the input and output end.

3) When the remote controller doesn't works:
   A. Maybe the battery is run out of, please change a new one.
   B. Maybe the controller is broken, please ask the dealer to fix it.

4) When user can not control the MVG Matrix by computer through its COM port, please check the COM port number in the software and make sure the COM port is in good condition.

5) When switching , the beeper beeps but without any output image：
   A. Check with oscilloscope or multimeter if there is any signal at the input end. If there is no signal input, it may be the input connection cord broken or the connectors loosen.
   B. Check with oscilloscope or multimeter if there is any signal at the output end. If there is no signal output, it may be the output connection cord broken or the connectors loosen.
   C. Please make sure the destination device is exactly on the controlled output channel

D. If it is still the same after the above checking, it may be something wrong in the switcher. Please send it to the dealer for fixing.

6) If the output image is interfered, please make sure the system is earthed well.

7) If the static becomes stronger when connecting the BNC connectors, it may be due to the incorrect earthing of the power supply, Please earth it again correctly, and otherwise it would bring damage to the switcher or shorten its natural life.

8) If the Matrix can not be controlled by the keys on the front panel, RS232 port or remote controller, the host may has already been broken. Please send it to the dealer for fixing.